



THE FIRST CONTROL POINT at Tonopah Test Range was a conglomeration of structures — a few ammunition storage igloos from the days when the Army Air Corps leased the site; a newly constructed 4800-square-ft. control point building in center of photo (with project office, test controller's control consoles, and a photo laboratory), a theodolite, and a tracking telescope; and three Butler buildings (pur-

chased from Kirtland Air Force Base for \$4,032, dismantled, and reassembled at TTR), which served as the REECo office, the Sandia stores warehouse, and housing for a 155-kW generator of electrical power. That building, behind control point building, burned down in May 1957; this photo was probably taken early that year. Story and more photos begin on Page 8

Tunnels & Hydrogen Don't Mix

Vandenberg Tests May Help Resolve Launch Site Problem

Before Vandenberg AFB in California can serve as a launch site for space shuttle flights, as scheduled for 1992, a perplexing problem — involving a tunnel and a few hundred pounds of highly combustible hydrogen — must be resolved.

The problem, first recognized last year, is that unburned hydrogen would be given off after an engine shutdown following a flight readiness firing or a launch abort in the final seconds before liftoff. And that hydrogen would flow into the huge tunnel located just under the launch pad. If it exploded, it would produce a pressure wave that might well damage the relatively fragile orbiter. That's where Sandia comes in.

Sandians played a major role in a series of tests from late June to mid-August at Vandenberg to determine what overpressures would result if small quantities of hydrogen were detonated in the tunnel. The Labs team included experts in hydrogen combustion and detonation, pressure measurements, field testing, and explosive experimental techniques. Sandia participated under a reimbursable arrangement with the Air Force.

Like a Megaphone

"The Vandenberg launch site has three tunnels," says Martin Sherman (6427), coordinator of the recent tests. "The shuttle's solid rockets exhaust into two smaller tunnels at each side of the launch pad. The liquid rockets for the main engines — the ones we're concerned about — exhaust through the larger tunnel in the center."

"After main-engine shutdown, hydrogen flow continues for several seconds at enormous flow rates — as much as 100 pounds of hydrogen per second," continues Martin. "The three main engines shut down sequentially, so we're looking at a time period of as long as seven seconds."

"That means there could be several hundred pounds of unburned hydrogen in the tunnel. The tunnel is quite large — 350 to 400 feet long, and some 35 feet wide at the opening nearest the launch pad. It acts somewhat like a megaphone, and would focus the energy straight up."

"Given the size and shape, we've estimated that possibly less than half a pound of hydrogen, if it detonates in the exhaust tunnel, could backfire — much like a car — and produce a pressure wave that may damage the shuttle."

Martin points out that the Vandenberg launch site problem is not related to the loss of the Challenger on Jan. 28. The problem does have national implications, however — if not resolved, it could cause delays in the first shuttle launch from Vandenberg, scheduled for six years from now. "People began to speculate about the potential hydrogen problem in 1985," reports Martin. "But it wasn't fully recognized until early January [this year]. We Sandians were called in as consultants because of our research during the last five years for the Nuclear Regulatory Commission on flame acceleration and hydrogen explosions and detonations [the cause of the problem with the Chernobyl reactor]; the Labs is considered a center of expertise in this technology."

"Joe Shepherd [1512] and I were invited to attend some meetings on the problem," he continues. "Then in March of this year, Sandia's role expanded from consultant to main actor when we took on a significant part of the responsibility for the overpressure experiments [the recent tests] at Vandenberg. Joe initially proposed the experiment idea, and also did the preliminary calculations of pressure transmission and an analysis of pressure measurement disturbance caused by transducer mounts used in the tests."

The Vandenberg test series involved setting up

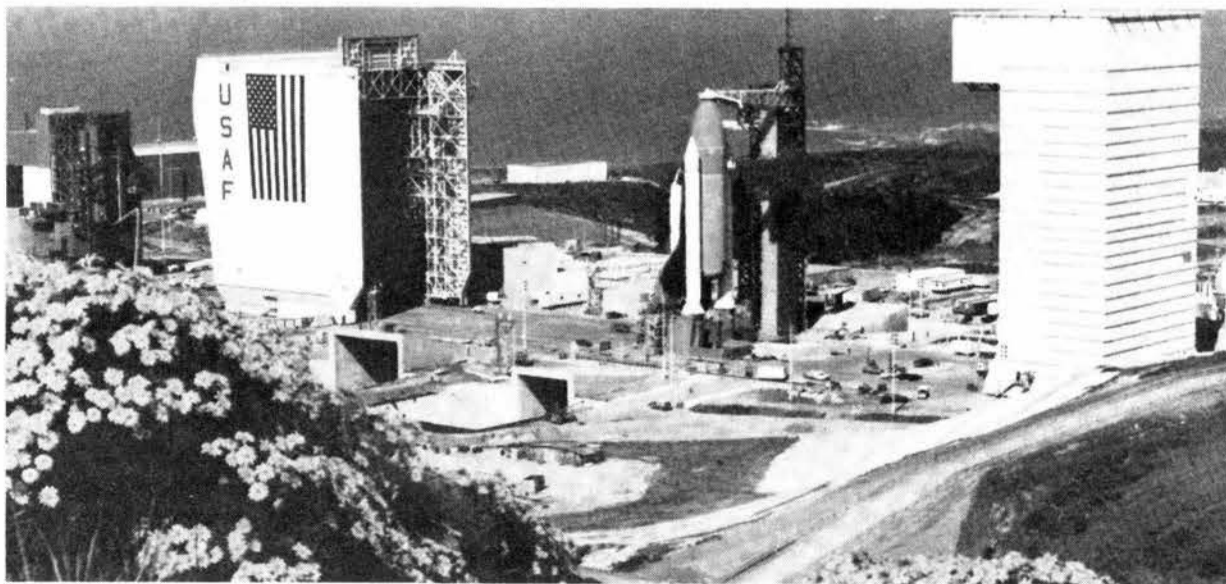
and firing controlled explosive charges in the tunnel after measured amounts of gas were fed into the duct. Two types of charges — hydrogen/air mixtures in plastic bags and high explosives (nitroguanidine) — were used. Pressure gauges (transducers) were placed at various sites in and above the tunnel to measure pressures generated by various amounts of hydrogen detonated in three different locations.

"The exhaust duct at Vandenberg has a sound-suppression water system that reduces reflected acoustic pressures and cools the tunnel," says Martin. "We wanted to check how effective the water spray system would be for reducing a pressure wave generated in the tunnel. So we ran tests both ways — with and without the water."

Sandia Responsibilities

Sandia responsibilities included setting up the charges; installing transducers at six locations, and checking the gauges before and after each test (for redundancy, three different brands of transducers were used at each location); arming and firing, including "pressing the button" to set off the charges; evaluation of test data; and preparation of a final written

(Continued on Page Five)



OVERALL VIEW of the space shuttle launch site at Vandenberg. This March 1985 photo, taken during an evaluation of launch support systems, shows the orbiter Enterprise (nonoperational) mated with a flight external tank and inert solid rocket boosters. Opening of the tunnel where test series was run is at left, below and to the right of the flag. (Martin Marietta photo)

Antojitos

The Old West and the New Best Tonopah Test Range, whose 30th anniversary we're celebrating in these pages today, juxtaposes the new and the old. As you sit in the air-conditioned comfort of the Control Point and watch a modern weapon delivery system (plane, missile, heavy artillery) get put through its paces, your glance may take in long-abandoned miner's cabins, wild horses, and ancient mountain ranges and lake beds.

The people who work at the Range have to get used to a certain amount of isolation too -- just as the earliest pioneers did. The isolation is one of the reasons the Range site was chosen; it means no neighbors complaining about the jet noise, no smog to hinder high-speed photography, and no curiosity-seekers pressing their noses to the fence. But the isolation also means no dashing into town for lunch (box lunches and varietal soft drinks are the hallmark of TTR's cuisine) and no leaving work early for dentist appointments.

Unlike the pioneers, however, TTRers commute by DC-9s, not by Conestogas. Which means they can live in Las Vegas, work all day at the Range (140 air miles, 240 highway miles from Vegas), and still be home (usually) for the Cosby Show.

TTR's a fascinating mix. Could Jim Butler return to Tonopah, he'd probably like the Test Range; it's certainly where the action is.

* * *

Meandering Through the Mailbag Erstwhile LAB NEWS summer staffer Sharon Ball sent in this little gem of a headline from the Tribune: "Broad rules upheld on sex harassment."

And if truth-in-advertising laws ever demand that we label LAB NEWS contents, we'll know just how to comply, thanks to retiree Bob Lucas, who found the following attached to his new indoor-outdoor carpet: "100% miscellaneous odd lots undetermined fiber content." I think that translates as "Damfyno" (which is what retiree Walt Westman used to call his boat).

Then there's the sentence that Bob Baron (2566) sent in. It's from Electronic Times, and it reads: "In one middle eastern city it's the custom of the police to spray paint boldly on cars that appear to have been abandoned." Well, I'd prefer "BOLDLY" to "JUNK."

* * *

Look Up Yourself! That's the advice of Gary Shepherd (2614). He's talking about the phone book, both personnel and organization sections, and his goal is to reduce the inaccuracies in that vital publication. If you've been mislabeled in any way, see your department secretary and get accurate. Good idea, Gary. (He's the Good Shepherd.)

●BH

* * *

In Honor of Our TTR Brethren, who sometimes leave for work at 4 a.m.: Al que madruga, Dios le ayuda. (God will help the one who gets up early, or "The early bird gets the worm.")

Workaholic's Out, Mission's In



Charles Garfield is one of the growing number of management gurus who travel the country giving inspirational advice to corporations. . . . [He] concludes that individual peak performers -- not the organization man or woman -- will shape America's future. Peak performers aren't workaholics, he found. "Workaholics are addicted to activity; peak performers are committed to results. Job obsession or job addiction is not the same as intense effort in the service of a compelling mission," he writes.

Wall Street Journal

Sympathy

To Eugene Polito (3426) on the death of his father-in-law in Albuquerque, Aug. 12.

To Robert Urias (7818) on the death of his mother in Albuquerque, Aug. 21.

To Clint Hall (1534) on the death of his father in Truth or Consequences, Aug. 22.

To Shirley Pike (2810) on the death of her sister in Little Rock, Ark., Aug. 26.

To Louann Grady (2812) on the death of her husband in Albuquerque, Aug. 26.

Retiree Deaths

Louis Zelnio (75)	April 2
Myron Schellhase (61)	April 21
Clifford Wolfenbarger (67)	April 24
Wallace Ives (69)	May 8
Richard Wonderlich (83)	May 23
Frederick Hohmann (68)	May 27
Evelyn Foote (67)	May 29
James McGovern (71)	June 2
Blake Liston (69)	June 4
Fernando Nizzi (72)	June 5
Fred Buttrey (83)	June 22
Edward Swanson (69)	June 22
Frederic Alexander (78)	June 28
Charles Crider (75)	June 28

Livermore Fun & Games

Four Livermore Sandians were on the AT&T runners' team that recently participated in the Manufacturers Hanover Corporate Challenge in San Francisco's financial district. Jim Reitz (8176) posted an 18:53 for the 3.5 mile course, Michael Alley (8265) registered a time of 19:30, Barry Bolden (8161) turned in a 22:27 time, and Joe Treml (8176) ran it in 23:50. Jim and Michael placed first and third, respectively, among AT&T team members. This fourth annual event attracted some 5000 men and women from 174 corporations, agencies, and schools. The top teams will compete in the Nationals Nov. 23.

* * *

Doug Bammann (8243) was a member of a three-person aerobic dance team that took second place in the recent Amador Valley Athletic Club aerobics competition sponsored by Reebok. Doug was part of "Mary Ann & The Petites"; judging was based on the group's dance routine (choreographed to music) and its costumes.

Events Calendar

Sept. 12-21 — "La Dama Duende," comedy by Calderón, La Compania de Teatro de Albuquerque; 8 p.m. Thurs. -Sat., 2 p.m. Sun.; KiMo Theatre, 256-7164.

Sept. 12-22 — "Mother Courage and Her Children" by Bertold Brecht (translated by Ralph Manheim), 8 p.m. Fri. -Sun., Vortex Theatre (Buena Vista & Central), 247-8600.

Sept. 12-26 — New Mexico Glass Show VI, UNM Student Union Bldg., 242-5582 or 842-5541.

Sept. 12-20 — "The Best Little Whorehouse in Texas," Albuquerque Civic Light Opera; 8:15 Fri. -Sat.; 2:15 p.m. Sun.; Popejoy Hall, 277-3121.

Sept. 12-20 — All-Star Rodeo, NM State Fairgrounds.

Sept. 12-21 — New Mexico State Fair, NM State Fairgrounds.

Sept. 12-21 — "Angels Fall," 8:30 p.m. (weekends), Corrales Adobe Theatre, 898-3323.

Sept. 12-21 — "Agnes of God," starring Sandy Dennis; 8 p.m. Tues.-Fri., 6&9 p.m. Sat., 2 p.m. matinee Sun.; Albuquerque Little Theatre, 242-4750.

Sept. 12-30 — Exhibit, Ye'ii, Ye'ii Bichai and Navajo dry painting ceremonial tapestries; 9 a.m.-4 p.m. Mon.-Fri., 10 a.m.-4 p.m. Sat.; Maxwell Museum of Anthropology, 277-4404.

Sept. 14 — Reception and exhibit, Santa Clara potter Margaret Tafoya, 1-4 p.m., Indian Pueblo Cultural Center, 247-4907.

Sept. 14-28 — Movietime at the KiMo, Great Cities and War and Peace Series: "From Here to Eternity," "Summertime," "Danton" (French with English subtitles); 7 p.m. Sundays, KiMo, 848-1374.

Sept. 17 — Tenth Anniversary Dance Celebration, 9-12 p.m., Indian Pueblo Cultural Center Activities Bldg. (north parking lot), 247-4907.

Sept. 18 — Tenth Anniversary Celebration: includes crowning ceremony of Miss Indian of New Mexico, craft demonstrations, Indian dances, free refreshments; 9 a.m.-6 p.m., free admission, Indian Pueblo Cultural Center, 247-4907.

Sept. 21 — Albuquerque Youth Symphony, 3 p.m., Popejoy Hall, 277-3121.

Sept. 23 — Lecture, "NASA: Space Shuttle" by astronaut Mike Mullane; 7 p.m., KiMo.

Sept. 25 — Storyteller Michael Blum, 9:45 a.m., South Broadway Cultural Center, 848-1320.

Sept. 26-27 — Concert, NM Symphony Orchestra and Chorus, 8:15 p.m., Popejoy Hall, 842-8565.

LAB NEWS

Published Fortnightly on Fridays

SANDIA NATIONAL LABORATORIES

An Equal Opportunity Employer

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CRF Award Given to Peter Witze

Peter Witze (DMTS, 8362) is the recipient of Sandia's annual Combustion Research Facility award for outstanding achievement. This is the second year of the award program, instituted in memory of the late Bill Adams of DOE's Office of Basic Energy Sciences. Bill was the original sponsor of the combustion program at Sandia.

Dan Hartley, director of Combustion and Applied Research 8300, presented the award to Peter. In his remarks, Dan said Peter was chosen because "he is probably the world's best at what he does, is internationally renowned for his work in the laser Doppler technique of velocity measurement, and was one of the pioneers in Sandia's combustion program when it began." His doctoral thesis on turbulent air motion provided the experimental background that led to Sandia's first research activity with internal combustion engines, which involved the development of advanced instrumentation to measure in-cylinder gas motion.

Dan also noted Peter's contributions to the visiting scientist program at the combustion facility. In the past year he hosted six long-term visiting scientists from four countries and the U.S., representing universities, industry, and national labs. Eleven technical publications have resulted from collaboration with visitors working in his laboratory.

The award recipient joined Sandia in 1966 after completing his undergraduate studies at Cornell and his MS degree at Stanford, both in ME. He later attended UC Davis through the Labs' educational aids program to earn his PhD in the same field. He then joined the combustion group when it was created in 1974, and has since published more than 30 technical papers in the areas of engine fluid mechan-



COMBUSTION AWARD recipient Peter Witze (DMTS, 8362), center, with his wife Carolyn and Dan Hartley (8300), who presented the award.

ics, turbulent jets, and optical diagnostics. In 1983 he was named a DMTS, and earlier this year received the prestigious Society of Automotive Engineers (SAE) Horning Award for the best paper of the year in the fuels-engines area. His professional affiliations include the SAE and the advisory committee of the

International Symposium of Laser Anemometry.

He and his wife Carolyn have three teenage sons and live in Pleasanton. Peter has been actively involved for many years with the Pleasanton National Little League, and enjoys family genealogical research and carpentry as pastimes.



SANDIA LIVERMORE NEWS

VOL. 38, NO. 18

SANDIA NATIONAL LABORATORIES

SEPTEMBER 12, 1986

EAM Goes International

A two-day workshop involving researchers from national labs and universities in five countries was held recently at Sandia Livermore to share information on the Embedded Atom Method (EAM), a new theory of metals that permits detailed studies of phenomena too complex and minute for previous studies.

Co-hosts Mike Baskes and Murray Daw (both 8341) said that EAM allows an approach to metallurgical properties on an atomistic scale. For example, in a situation where a metal — such as an alloy of iron and nickel — is made up of more than one kind of element, one of the constituents may migrate to the surface, to defects, to impurities, or to boundaries. These complicated phenomena can now be measured and analyzed (for more detail, see *Sandia Technology*, Dec. 1985).

An example that is of interest to Sandia is the fracture of metal in the presence of hydrogen and helium. "With this new method," says Murray, "we hope to be able to describe the processes that determine the strength of the materials under unusual environmental conditions on an atomistic scale so we understand the physics of the metallurgically interesting process." EAM is also being used elsewhere to study chemical reactions on surfaces and so to learn more about the technologically important processes of corrosion and catalysis.

Kicking off the workshop were two scientists from Denmark and Canada who originated the concepts dealing with hydrogen and helium in metals some five or six years ago. Jens Norskov, from NORDITA in Copenhagen, and Malcolm Stott, from Queen's University at Kingston, Ontario, delivered opening talks on the basic theory.

Murray said the purpose of the workshop was to share information among the various international research organizations, thus introducing additional scientists to EAM's many applications. The hosts gave the participants computer programs to take home to their laboratories and universities.

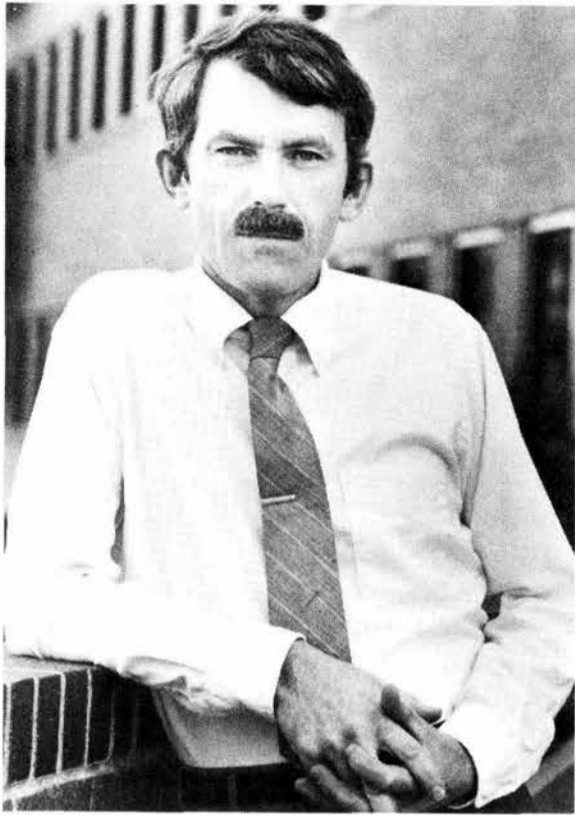


LEADING PARTICIPANTS in the EAMS workshop were (from left) Jens Norskov (Copenhagen), Michael Baskes and Murray Daw (both 8341), and Malcolm Stott (Kingston, Ontario).



SANDIA'S TWO Chabot College Campus science and engineering transfer scholarship winners for 1986 talked about their future plans with Arnold Schuknecht, Department 8020. Belynda Bell is a 1982 Granada High School graduate and will be transferring to UC Davis this fall to major in chemistry. She is working in the Exploratory Chemistry Division 8315 at Sandia this summer. Chris Frerking, who is working in the Weapon Subsystems Development Division 8175, will attend UC Berkeley this fall majoring in physics. He is a 1984 graduate of Foothill High School in Pleasanton.

Supervisory Appointment



NEAL McEWEN to supervisor of Payment Processing Division 154, effective August 1.

Neal came to Sandia in June 1978 as a member of Contract Audit Division East 121. In January 1981, he joined Financial Policies and Procedures Division 131 and then, in January 1985, Management Information and Results Division 133. In January 1986, Neal became supervisor of Payment Processing Section 154-1.

Neal has a BA in government from the University of San Diego, an MEd with concentration in government from the University of Arizona, an MBA in accounting from the University of Arizona, and a certificate in management accounting (CMA).

He is a member in the Institute of Management Accounting. He and his wife Linda have one daughter and live in Cedar Crest.



HOT POTATO? No, it was simply a start toward filling a new vegetable bin. Both were presented to gourmet cook Nancy Finley (now 6321, but until recently 3523), right, in appreciation for her work during the last three years as Sandia coordinator of the Summer Teachers' Enrichment Program (STEP). Sheri Benischek, science/math teacher at Sandia Preparatory School and STEP participant (Div. 1235, summer of '86), made the presentation. STEP provides teachers summer work experience at Sandia in high-tech and research jobs. Nancy originated the program in 1984 when she was assigned to Div. 3523 and had responsibility for math/science liaison with the schools.



BEFORE SPEAKING at a Sandia Colloquium last week, Senator Jeff Bingaman visited with his host, President Welber. According to the senator, the current Senate is leaning more toward conventional munitions, less toward nuclear, than its predecessors.



AIR FORCE recognized Sandia's role in improving the Air Force's disaster response capability, specifically in the area of explosive ordnance disposal (EOD). Don Rohr (left), supervisor of Weapon Procedures and Logistic Support Division 7212, and Judy Mead (second from right), supervisor of Weapon Training and Evaluation Division 7213, received the plaque and certificate from Capt. Tim Seratt and Col. Dennis Garcia, respectively, of the Air Force Logistics Command/Nuclear Support Office. "Our EOD people have the accurate technical data and detailed training needed to respond to nuclear weapons accidents. Much of the credit goes to the Sandia community, especially to the weapon development groups [5100 and 8100] and to Don's and Judy's divisions," noted Col. Garcia. Div. 7212 writes weapon system tech data; Div. 7213 trains members of the EOD community.



TWO SANDIANS are involved with the Albuquerque Civic Light Opera's current production, "The Best Little Whorehouse in Texas," playing through Sept. 20 at Popejoy Hall. Allison Davis (1813) is co-director of the show; Wilson Brooks (1652) plays a Texas Aggie. Curtain is at 8:15 on Friday and Saturday nights and at 2:15 on Sundays.

Sandians at Vandenberg

report. Pressure gauge data from the tests are now being analyzed.

Other organizations involved in the tests were the Air Force, Martin Marietta, Rockwell International, Lockheed, Grumman, Bechtel, NASA, and Aerospace Corp.

Martin has the highest praise for his Sandia colleagues who were on site for the tests. "They're real pros," he says. "For example, Ray Peabody [7132], our leader for explosives handling, and explosives handler John Dunkin [also 7132] did all the arming and firing during the tests. Every test worked perfectly; there were no misfires, and Ray and John were always ready to fire the tests as scheduled."

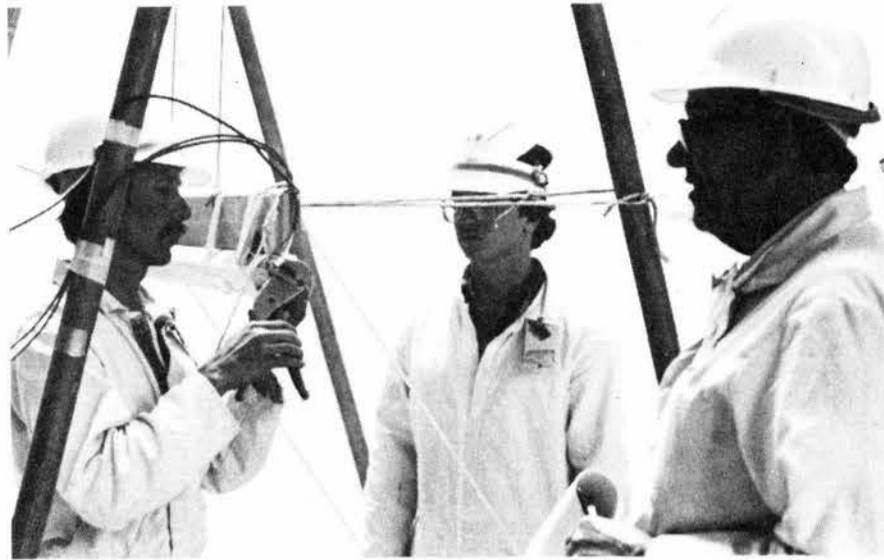
In charge of the tests while Martin was gone for 2-1/2 weeks on a business trip to Europe were Bill Benedick (1131) and Sheldon Tieszen (6427). "Bill and Sheldon had a big share of the responsibility," says Martin, "because most of the tests occurred during the time I had to be away from the site." Bill also had responsibility for explosive experimental techniques, and Sheldon worked on hydrogen combustion experiments prior to the Vandenberg tests.

Four Possible 'Fixes'

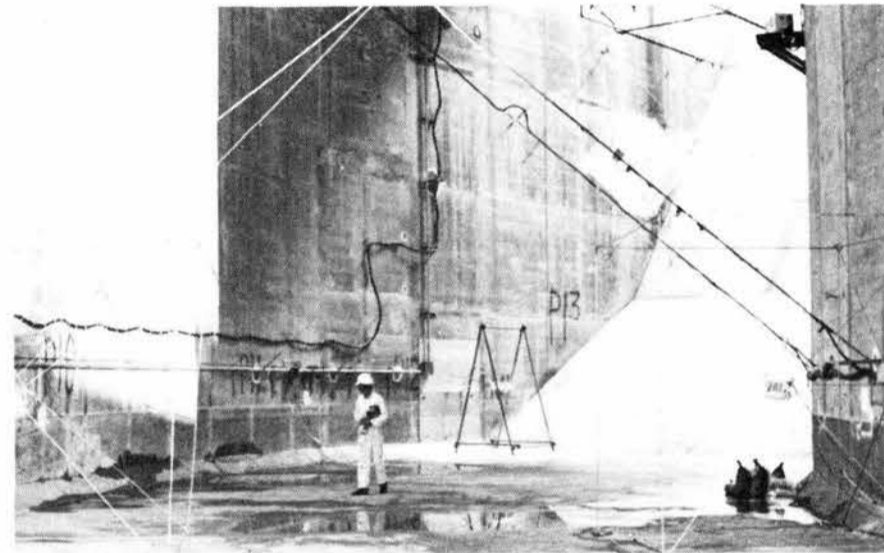
"Our tests were part of a larger program," continues Martin. "They're not a solution *per se* for the hydrogen explosion problem, but they'll help determine what route should be taken to mitigate the problem. Right now, the Air Force is looking at four possible 'fixes.' One scheme involves burning up the hydrogen, perhaps with a method such as the one used at the Kennedy launch pad during engine start-



RAY PEABODY (7132), explosives handling leader, gets ready to fire one of the tests. (Air Force photo)



JOHN DUNKIN (7132, left) connects firing lines to explosives as David Weigand (Ktech, center) and Bill Benedick (1131) look on.



EXPLOSIVES HANDLER John Dunkin (7132), dwarfed by the Vandenberg tunnel, makes some last-minute checks before a test. This end of the tunnel is closest to the shuttle launch pad. Suspended above John — to the right — is one of the hydrogen bags used during testing.

up. It involves using small rocket motors that shoot out flaming zirconium particles that ignite the hydrogen.

"Another way to burn up the hydrogen is so-called jet mixing; a series of air jets would be used to enhance hydrogen mixing, and igniters would burn the residual hydrogen. The problem here is that virtually all the hydrogen must be burned, because even very small amounts of unburned hydrogen might cause damage.

"The second major fix being considered is to make the hydrogen/air mixture inert by adding enough of a diluent gas to it so that it can't burn. Nitrogen, carbon dioxide, and steam are examples of such gases. The drawback here is that enormous quantities of gas are needed to do the job, so there are some major engineering problems.

"The third scheme involves opening up the whole tunnel — an enormous construction job that would take two years. The other option is to place a

J-shaped deflector above the tunnel to move engine exhaust away from the shuttle [completely bypassing the tunnel]. Right now all these choices are under consideration, though the second [inerting the mixture, probably with steam] and the fourth options appear to be the current favorites."

Other Sandians working on the hydrogen disposal problem: Allen Church (7132 supervisor), whose group handled explosives for the tests; Byron Hock (7137), SNL representative at Vandenberg; Charles Daniel (1131), machinist and explosives technician; David Weigand (Ktech Corp.), hydrogen combustion experiments; Ken Miles (3441), safety concerns; Marshall Berman (6427 supervisor), program manager; Paul Cooper (7132), explosives consultant; Bob Donohoe (7123), cables and connectors work; Doug Pastor (7137), electronics technician; Joe Black (DMTS, 1522), structural consultant; Frank Chavez (1512), electronics technician; and Jerome Biedscheid (7522), data analyst. ●PW

RUDOLPH OTERO (right), a member of the Veterans of Foreign Wars Civil Service and Employment Committee, recently presented a VFW Employer Award to Sandia. Marv Torneby (3530), who accepted the award on behalf of the Labs, looks like he enjoyed himself during the ceremony. The award cites the Labs "for an exceptional and outstanding record of employing veterans."



Congratulations

To Elveta (150) and Luke Bishop, a son, Mackenzie Patrick, May 14.

To Ana Maria and Gerald (7811) Depuydt, a son, Patrick, Aug. 20.

To Maureen and Dave (7818) Gonzales, a daughter, Vallery Ann, Aug. 28.

To Janet and Bob (1523) Chambers, a daughter, Ivy Marie, Sept. 4.

The High Cost of Standing Tall



People staring at East Germany's only modern tourist attraction might have noticed that the guards on duty in those barbed-wire towers along the border are looking stiffer than usual. The reason is that, to combat costs, a number of live guards have been replaced with cardboard lookalikes. The rationale, we assume, is that after decades of puppet government, East Germans have forgotten the difference between real and unreal. But any seeking freedom will remember that there's been no reduction in self-shooters, mines, and fierce dogs.

TLC = Positive Lifestyle Changes For First Participants

Sandians enrolled in the first round of classes in Medical's Total Life Concept (TLC) wellness program greeted the program enthusiastically — by exchanging bad habits for good ones — and they're healthier: "They changed to more positive lifestyle behaviors," to use the words of program manager Susan Harris (3330).

"The TLC program — like its participants — is definitely alive and well," says Susan. "Results from program classes taught in January and April provide solid evidence that Sandians want to live happier, healthier lives, and that they'll work hard to achieve that goal."

So what kind of results have come from the program, which was announced by the LAB NEWS almost a year ago (Oct. 11, 1985)? Susan gave us a few specifics:

- significant reductions in cholesterol among participants whose initial cholesterol levels were greater than 240 mg/dl;
- a 76 percent completion rate in the fitness classes — well above the national average of 50 percent completion for work site fitness programs;
- a cessation rate of 68 percent for participants who completed the stop-smoking class;
- an average loss of 11 pounds during the

12-week weight loss classes;

- the detection of one early breast cancer and several precancerous colon lesions as a result of information presented in self-care classes.

How does TLC work? Invitations are sent (at random) to about 1500 employees per year. Employees, once they're enrolled in the one-year program (it's strictly voluntary), attend an orientation session during which they complete a Health Risk Appraisal (HRA). Next comes biometric testing to determine height, weight, blood pressure, and cholesterol measurements. After receiving feedback on the HRAs, participants decide which of the nine TLC health lifestyle classes would be best for them (they're allowed to choose three during the year) and plan their personal health improvement programs.

The classes, lasting from 4-12 weeks, usually meet for 45 minutes once a week. They cover the following areas: fitness/exercise, back care, blood pressure control, cholesterol reduction, interpersonal communications, smoking cessation, self-care and cancer awareness, stress management, and weight reduction.

Susan says that group data collected on HRAs from the first 600 TLC participants indicate that the risks for the four major causes of death (heart disease, stroke, cancer, motor vehicle accidents) are the

same for Sandians as for the U.S. population as a whole. However, there's a significant difference between the smoking behavior of Sandians and that of the general adult population; the Sandia sample indicated that only 10 percent were smokers (at the time they filled out the forms), compared to 30 percent elsewhere. "That statistic tells us that Sandians not only receive health information, but act on it as well," says Susan.

TLC invitations were sent to a third group of would-be participants in July, and their classes begin this month. "We're delighted with the enthusiastic comments we've received from people enrolled in our January and April classes," adds Susan. "We've seen some outstanding examples of individual health and lifestyle improvements in a relatively short period of time [see "Proof of the Pudding"]. It's obvious that Sandians care a great deal about how they feel — their quality of life.

"Getting healthy and staying healthy have obvious rewards; people are much more effective — both on and off the job — when they feel good. TLC is designed to help them do that, and we're glad that employees have shown such positive reactions to the program." ●PW

Fewer Calories, Smaller T-Shirts

TLC's Participatory Partners

The food we eat can be a major enemy in the ongoing war some people must wage to lose weight. The villains in that continuing battle are things like fast food (often laden with fat and cholesterol), those sinfully rich desserts that tempt us from time to time, or creamy sauces and soups, to name a few. What's really needed are some healthful — and tasty — alternative choices when it comes to food selection.

TLC manager Susan Harris believes that the corporate environment can help or hinder employees as they try to make positive lifestyle changes. Therefore, she's worked with both the Sandia cafeteria and the Coronado Club to assure that the noontime lunch crowd has nutritious choices when facing the food line.

Jim Unger, new cafeteria manager, indicates which menu items are low in calories, fat, and cholesterol by marking them with an asterisk in the *Weekly Bulletin* listing. He's also introduced several new products in the cafeteria. "One of the most popular is a frozen fruit dessert, Yodolo, which certainly has the TLC blessing," says Susan. Jim is also adding vegetarian entrees to the menu, so lunchers will be able to escape the red-meat-every-day syndrome.

Maggie Pappas, Coronado Club catering honcho, has come up with several new healthful menu items, including a popular turkey picatta. The new items are available for special catered luncheons and dinners. In addition, regular lunch choices at the C-Club always include some TLC-recommended items, reports Susan.

Enthusiastic TLC participants have requested T-shirts to indicate their support for the program. So, not to be outdone in the cooperative effort, the South Highway 14 Project is selling TLC T-shirts for \$7. They'll be on sale at the LAB NEWS office, Bldg. 814, by the end of September.



BETWEEN THEM, they've lost 35 lbs. since they began the TLC program. Irene Thurston (2621, left) and Bonnie Roudabush (312) sample a new frozen fruit dessert, Yodolo (only 70 calories in 4 ounces!), now offered by the Sandia cafeteria.

Proof of the Pudding

TLC program manager Susan Harris reports she has received many enthusiastic comments from Sandians enrolled in the first round of TLC classes, which began earlier this year. But results are measurable in more than enthusiasm. Some outstanding examples:

- **Bonnie Roudabush (312)** — Bonnie enrolled in weight reduction and aerobics classes. She lost 24 lbs., and ran the London marathon in 3 hrs., 9 min. — her best marathon time ever. "When you keep track of every bite you eat and weigh in at every class session, you really stick to a diet!" says Bonnie.
- **Jose Guillen (343)** — Jose lost 20 lbs. with a combination of weight reduction and aerobics classes. "I'm not a fanatic about my diet," says Jose. "But through TLC, I learned what foods to avoid. For instance, I used to OD on high-fat dairy products — especially milk; I don't do that anymore. And I really enjoyed the aerobics class — looked forward to every session. At one time, I thought aerobics was only for women. I didn't know what I was missing!"
- **Paul O'Brien (6311)** — Undoubtedly the champion weight loser in TLC's first round, Paul has dropped 85 lbs. (count 'em!) since he began the program in January. "I shrank right out of my artificial leg," says Paul, "but

a new one [leg] is on order!" The information on basic nutrition that he received in his TLC weight reduction class was the key to his success, Paul comments. "I go now for the food that gives me the most bites per calorie," he says. "Those radishes and carrot sticks taste pretty darn good."

- **Sam Bolin (1623)** — Sam lost between 30 and 40 lbs. and decreased his cholesterol count by 50 mg. — and his heart disease risk by 40 percent* — as a result of his aerobics and cholesterol reduction classes. "TLC is tremendous — I give it an A+," says Sam. "It's one of the best things that Sandia has ever done for employees. Taking care of myself is now my No. 1 priority; it used to rank behind youth soccer and some other things. Not any more."
- **Irene Thurston (2621)** — Irene reduced her cholesterol count by 32 mg. and lost 11 lbs. at the same time. "Food with a high fat content is the culprit if you're trying to lose weight or to decrease your cholesterol count," she says. "I find myself eating a lot more fresh fruits and vegetables now — and I avoid fried food like the plague."

*For each one percent reduction in cholesterol count, there's a two percent reduction in heart disease risk.

Radar Intrusion Detection System Protects Parked Aircraft

The plane's on alert, on the ground, and unattended — perhaps for several days at a time. People in charge want assurance that unauthorized snoops aren't poking around the big bird. As the Air Force expressed the problem: provide a security system to detect intruders near parked aircraft that meets AF Mobile Individual Resource Protection System (MIRPS) requirements.

The solution, supplied by Mike Callahan and Bryan Burns (both 2345), and patented by the Air Force in their names: an aircraft security radar (ASR) system that detects moving vehicles traveling at speeds up to 90 mph, or intruders crawling along the ground at a not-so-breakneck pace of five feet per minute.

The ASR system uses five receiver-transmitter units placed around the aircraft in a pentagonal array. "We used this arrangement — rather than three units in a triangle, or four in a rectangle — because the pentagonal array takes much less area for aircraft protection," says Mike. "The ASR's sensitive volume [area in which movement can be detected] must be limited to as small a region as practical. That's one of the MIRPS requirements. Sensitive volume should be close to the aircraft, but not include the aircraft itself; otherwise, such activities as maintenance work on the plane could trigger nuisance alarms.

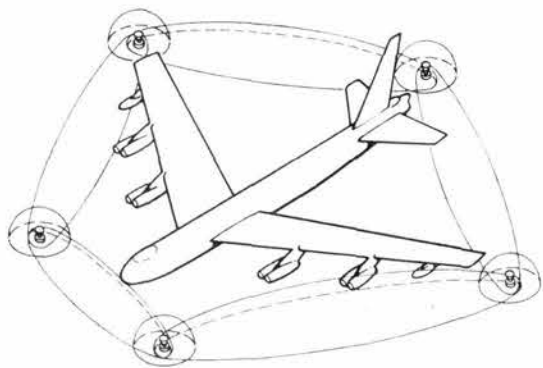
"The system's sensitive volume is very well defined," Mike adds. "Large moving objects such as vehicles as close as one metre to the sensitive volume do not cause alarms."

Other Requirements

MIRPS also requires that the system be portable and battery-powered, and have no cables outside the unit. It must operate reliably in all weather conditions, and it should be simple, rugged, and easy to operate.

The system is designed primarily to protect C-5As at civilian airports overseas, C-5As with sensitive cargo at Air Force bases, and B-52s on alert.

Each of the five ASR units spaced around the aircraft has a transmitter that communicates only with the receiver in the next unit, establishing a sensitive volume of five narrow ellipsoids linking the five receiver-transmitter units. All five transmitters oper-

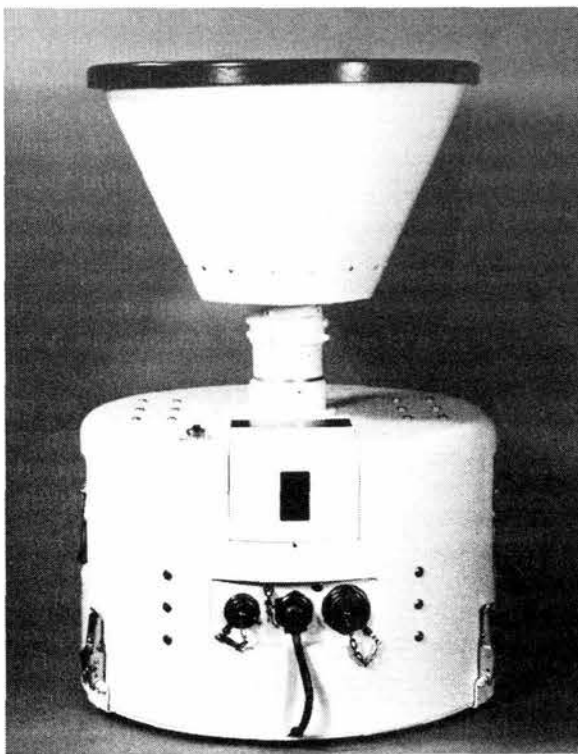


AIRCRAFT SECURITY RADAR (ASR) system deployed around a B-52. Sensitive volume (area in which movement can be detected) is in five narrow ellipsoids linking the five receiver-transmitter units placed around the plane.

ate on the same radio frequency (RF), but each has a unique pulse-repetition frequency.

The associated transmitter and receiver are synchronized by phase-locking a clock in the receiver to the transmitter's pulse-repetition frequency. Installers place the units around the aircraft in a specified sequence so that each receiver synchronizes with the appropriate transmitter.

The guard force receives alarms from ASR via a microwave data link installed in one of the five units. If a receiver in a unit without the microwave link alarms, it modulates the signal from the unit's transmitter. The modulation simulates a target echo



RECEIVER-TRANSMITTER UNITS used in the aircraft security radar system are 18 inches in diameter and 26 inches high, including the inverted cone radome on top. The radome minimizes nuisance alarms that might be caused by rain.

and causes the receiver in the next unit to alarm. The alarm continues to travel through the units until it reaches the unit with the microwave link, which then alerts the guard force.

Signals indicating a condition that requires maintenance, e.g., low battery voltage, are passed around and transmitted to the guard force in similar ring-around-the-rosy fashion. Another capability of the system is a self-test feature so the guards can periodically ensure that all ASRs in the array are operating properly.

ASR units are small (18-in. diameter, 26-in. height) and are located close to the ground to minimize wind resistance. Each unit weighs 80 lbs., including electronics and batteries. A rain shield and inverted cone radome on top of each minimize nuisance alarms that might be caused by rain.

"One of our primary design goals for the ASR electronics was to minimize power consumption," says Bryan. And minimize they did: the entire ASR consumes about one watt, which yields over 100 hours of operation on rechargeable lead-acid batteries. (The reasonably priced batteries can function over the wide range of operating temperatures expected: -40 degrees to +60 degrees C.)

Two categories of tests — intruder detection and nuisance alarms — have been performed on the ASR. The ASR came through with flying colors on detection ability, since it always recognized creeping intruders at average speeds greater than four feet per minute, including people as light as 66 pounds.

Nuisance alarms are potentially a serious problem; weather extremes pose the most dangerous threat. However, the ASR proved relatively insensitive during testing. "People in the climatic lab at Eglin Air Force Base did some extensive wind-and-rain testing for us to determine whether or not severe weather could trigger nuisance alarms," Bryan reports. "Rain rates up to 5.9 inches per hour and wind speeds up to 62 miles per hour were tested separately with no alarms. We did learn that alarms will occur if a very strong wind blows a relatively large amount of rain onto the ASR unit's radome. But that combination occurs a small percentage of the time at most locations, so nuisance alarms from weather should not be a problem."

ASR work was sponsored and funded by the Physical Security Systems Directorate, Electronic Systems Division of the Air Force Systems Command, Hanscom AFB, Mass. ●PW

Take Note

The 15th Annual International Balloon Fiesta lifts off Oct. 4-12 for nine days of fun and excitement. More than 550 pilots plan to participate in events launched from a new balloon field located between Paseo del Norte and Alameda Blvd. The program starts with the spectacular mass ascensions and includes parachute jumps by the Navy Leapfrogs and the Army Golden Knights, band concerts, the Fiesta parade, the 6th Annual Gas Balloon Race, the Air Force Thunderbirds, and multicultural foods and dancers. There are ways to be a part of the action. Volunteers are urgently needed to work in the propane line from 8:45 a.m.-1 p.m. Oct. 4-11. If you can help full- or part-time, please call Sandy Dawson at the AIBF office on 344-3501. For information on hot air and gas balloon pins and patches and balloon calendars, call Ruth Birdseye on 255-6328. Fiesta bumper stickers and program brochures are available in the LAB NEWS office (Bldg. 814) and in Finance (Bldg. 802).

Those who missed it the first time will have another opportunity to see the NOVA/Frontline special "Visions of Star Wars" when it's rebroadcast on Sept. 23 at 8 p.m. on KNME-TV5. Will SDI work? What are its political and scientific implications? Those questions are at the heart of the two-hour documentary. NOVA and Frontline went behind-the-scenes — into laboratories (including Sandia) across the country — to meet scientists who are wrestling with the challenge of creating a new defense technology.

The New Mexi-chords, a barber shop chorale, will present "Harmonies for Hospice" on Oct. 24 at 8 p.m. at the Hoffmantown Baptist Church (2335 Wyoming NE). Proceeds from the concert will benefit the Hospice Patient Care Fund at Hospital Home-Care, a full-service, not-for-profit home health care agency. Hospice is a program of medical and nursing care and emotional support for patients with life-limiting illness and for their families. Tickets for the concert are \$6 per person and can be ordered by calling Mary Zack or Lezlie Ann Schubert in the Hospice community liaison office at 842-7100.



Here are a couple of current opportunities for employees, retirees, and family members. If you would like more information, call Karen Shane (4-3268).

NEW MEXICO SKI TOURING CLUB (majority of members are Sandians) is looking for help with its fall maintenance projects in the Jemez Mountains. On the weekend of Sept. 20-21 arrangements have been made to stay at the Forest Service Lodge at San Antonio Hot Spring. Another work day is scheduled for Saturday, Oct. 4. Club tools will be available on these outings, but you are welcome to bring your own.

COURT-APPOINTED SPECIAL ADVOCATES are needed to work with the Juvenile Justice Center and the courts on cases of child neglect and abuse. CASAs, appointed by the Children's Court to serve as monitors and advocates, make independent recommendations to the court regarding the child's best interests and ensure that treatment goals are being met. Each CASA is required to submit reports that become part of the child's case record. Training will be provided on the mornings of Sept. 13 and 27.

Tonopah Test Range: The Search for a Site

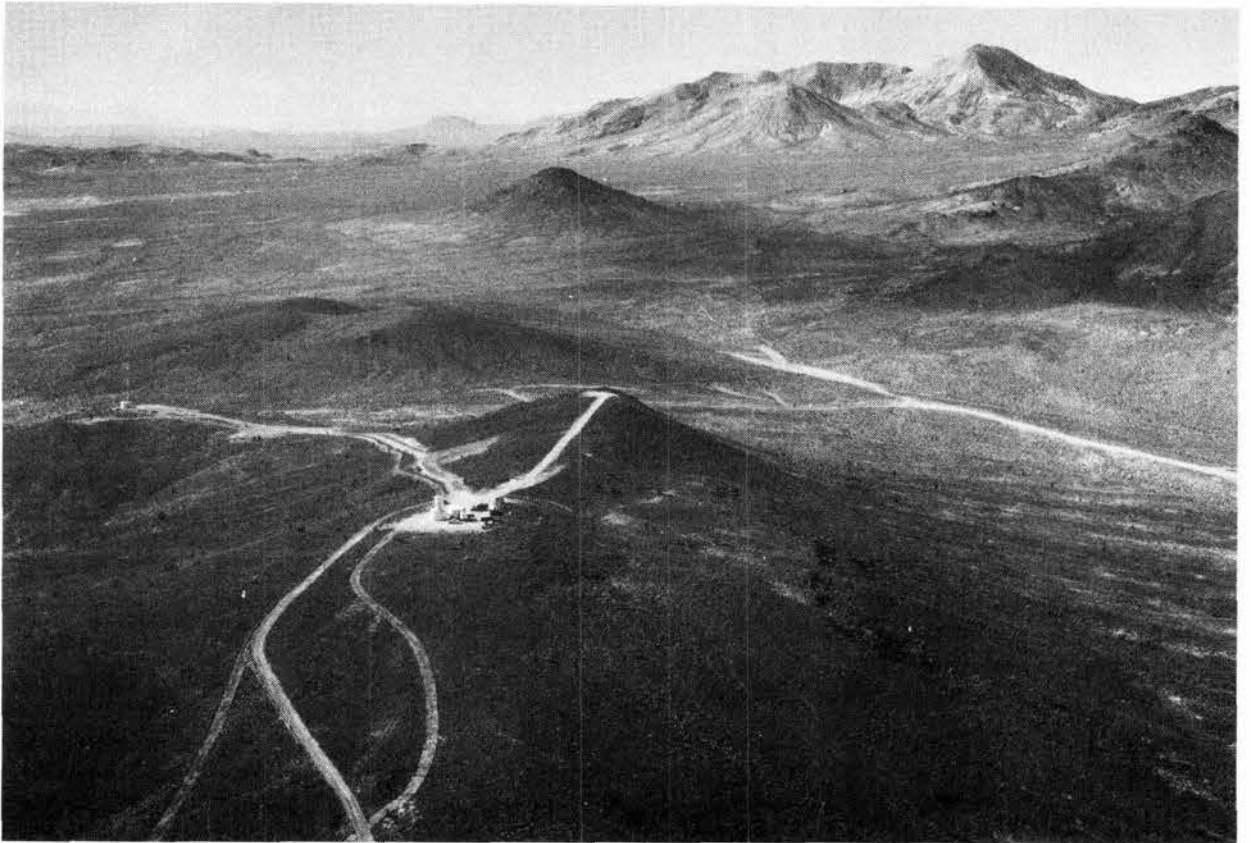
On Sept. 12, 1956, Ben Benjamin (7137) and Don Beatson drove some stakes into the desert some 34 air miles southeast of Tonopah, Nev.

This literal "staking out the territory" marked the site of what would become the Control Point, headquarters of Sandia's permanent air drop test facility, Tonopah Test Range (TTR).

With Sandia's mission including then, as now, the responsibility for ensuring that the nuclear weapons designed and developed at the Labs would work properly in the various delivery systems available, a drop test site had always been an integral part of the Sandia weapon development program.

In a sense, TTR was the final descendant of a long line of drop test sites. The first such, used briefly in late 1945, was an old bombing range near Los Lunas, just 25 miles southwest of Sandia Albuquerque. Handy, yes, but its 5000-ft. altitude posed some problems, so a test site on the shores of the Salton Sea in California replaced Los Lunas in 1946. That site was used until the mid-50s, when dual encroachments by people and smog began to reduce the open space needed for high-speed bomb drop missions and the clean air needed for high-resolution photographic documentation.

The search for a successor to Salton Sea — a site that would provide a land rather than a water target — included several other desert regions in California and ended, temporarily, with the selection of



"RADAR HILL" in the mid-60s, with Antelope Peak on the far horizon.



PRECISE SURVEYING was necessary to position each tracking station. Here, Ben Benjamin (now 7137) runs a transit in late 1956 or early '57. "We had to know locations of camera stations in relation to U.S. Geodetic Survey markers, with no more than one-foot tolerance," Ben recalls. Umbrella was for the instrumentation, not for personal comfort. "When it got too hot, we worked at night," says Ben.

the Yucca Lake Range in 1954. Yucca is a dry lake bed 20 miles north of Mercury, headquarters for DOE's Nevada Test Site. Unfortunately, the lake bed is surrounded by mountains, which made low-level bomb drops difficult; and NTS was rapidly expanding its atmospheric and surface nuclear device tests, which meant periodic evacuation of the drop test site.

While Tonopah was operated on a "temporary" basis, the search continued. Four areas in New Mexico plus a portion of the Navajo Reservation in Arizona were rejected for various reasons. In 1957-58, some drops were made at the abandoned Melfa Airfield near Chincoteague, Va., just 100 miles southeast of Washington, D.C. That site was far from ideal: The only possible flight path was north to south; the runway was narrow, so drops couldn't be made during strong crosswinds; the field was surrounded by trees, so camera coverage was difficult. But the biggest problem was security — the field could be used



ATOP THE TOWER is an Askania cinetheodolite used to record trajectory information in the 50s and 60s. Now completely replaced with more sophisticated technology, the devices were transplanted from the Salton Sea Test Range. As right photo indicates, short operators had to wear elevator shoes to see through the viewfinders.



CURRENT RANGE COMMANDER is Ron Bentley (7170).

for emergency landings of civilian aircraft. (In fact, a plane once landed at the field right after a drop and taxied by a crater containing a classified weapon shape.)

Sandia then moved, again temporarily, to the old Dalhart (Tex.) Air Force Base and used it for tests from mid-58 through mid-60. Winters were

tough out there on the Panhandle, so much so that some tests had to be postponed several times. Not a good permanent test range.

Other areas of New Mexico, a portion of the San Luis Valley in Colorado, and a piece of the Amargosa Desert in Nevada were considered and rejected.

Then came a consensus on the Tonopah site. A good choice, we can now say with the hindsight of 30 years. It's proved to be everything a test range

(Continued on Page Ten)



EARLY LAYDOWN weapon development test at TTR meant dropping a weapon from low altitudes on a hard (here, concrete) target.



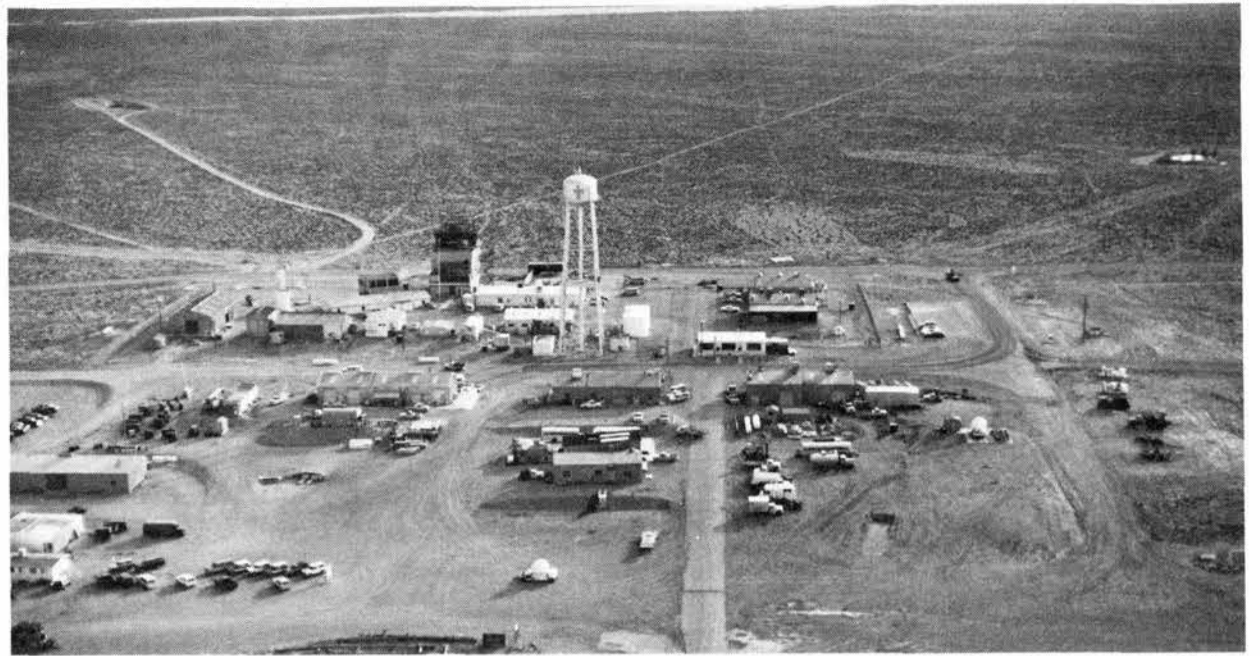
CLEM ROLLINS was range support section supervisor during the early days. Later he joined REECO, the company that constructed and still provides support operations at TTR. The well is the first one at the Range; it went dry during an earthquake in the early 60s.



THE MAN is Al Gruer, first department manager with the responsibility for TTR. In the late 50s, he spent some six months in the town of Tonopah but normally worked out of Albuquerque. The coat is one he rescued from the parking lot near Medical. Ben Benjamin (7137) snapped the photo of his boss in 1957.



THREADING A 35-mm Photosonics (high-speed motion picture camera) is Joe Durrenberger (ret.); he was one of several photo-technicians at TTR in the 60s.



THIS 1983 PHOTO shows TTR's Control Point after the most recent major modernization (compare it with the photo on Page One). All tests are controlled from the glassed-in tower left of the water tower.

Burros, Booms, and Boxers

The Ups & Downs of Tonopah Town

The town of Tonopah grew up around a spring in the desert halfway between Carson City and Las Vegas. The Shoshone Indian name for the place was Tonopah, meaning "little wood, little water." In other words, an oasis.

On May 19, 1900, a rancher named Jim Butler camped at the spring. The next morning, he found his burros had wandered away. Bad luck. But while rounding them up, he found an outcropping of quartz heavily stained with silver. Good luck. He filled his pockets with chunks of ore and headed for the small mining town of Klondike.

But he didn't have the dollar it would take to have his ore samples assayed, nor could he borrow the dollar (not surprising; his assets on the local tax records the previous year totaled exactly \$10). Bad luck.

Jim headed home, defeated. But his wife enlisted the aid of a schoolteacher who moonlighted as an assayer, and Jim's belief that his stumbled-upon quartz samples were rich in silver was confirmed. Good luck; Jim was now on a roll.

In August, the Butlers and a young lawyer named Tasker Oddie returned to Tonopah and staked out several claims on Mizpah Hill (on the steep slope behind the present Mizpah Hotel).

The news of the strike spread swiftly, and soon a tent city sprang up at Tonopah. Real buildings rose soon after, the first ones frame houses imported from nearby mining towns, the later ones substantial stone structures. The population hit 15,000, and silver production skyrocketed — just before Jim's strike, the yearly output of precious metals in the entire state of Nevada was \$2.6 million; a few years after the strike, the annual production figure for Nye County (in which Tonopah is located) topped \$10 million.

Until July 23, 1904, mule teams hauled out the ore, but on that date a train chugged into town on a hastily built narrow-gauge railroad that con-

nected with the Southern Pacific line 60 miles northwest. According to Sandia historian Ted Alexander, the train's arrival "triggered a three-day celebration, officially proclaimed as 'Railroad Days,' with parades, brass bands, foot races, rock-drilling contests, street dancing, baseball games, fireworks, and various unscheduled free-for-alls."

Tonopah fervor continued over the next few years. In 1906, some proposals to "put the area on the map" included sending up a balloon with a basket containing \$5000 — finder take all; digging a hole the size of a small lake and filling it with free beer; or importing some camels and setting up the world's first camel-racing and gambling track.

The proposal that was finally acted upon was a logical successor to the spontaneous fights of Railroad Days: The area would stage a world's championship boxing match on Labor Day in the nearby town of Goldfield. The promoter, Tex Rickard, matched the current lightweight champion, Joe Gans, against Battling Nelson. Gans, an American Black, has been called by some the greatest boxer of all time; he lost only five of 200 fights with all comers, lightweights to heavyweights, and was world champion from 1902 to 1909.

The fight, scheduled for 45 rounds, was halted in the 42nd round when Nelson was disqualified after a series of flagrant fouls. The area received the desired publicity, but it wasn't enough to overcome the fact that the ores played out almost as quickly as they had been discovered — by 1914 the boom had subsided, and both Tonopah and Goldfield became semi-ghost towns; the current population of Tonopah is less than 2000.

It's been a long time since the silver strike, but the folks who roam the Test Range have been known to look carefully at any strangely colored chunk of quartz they happen to dislodge, and some favor trading the range's wild horses for some tame burros.



FOURTH OF JULY parade in 1942 featured a bombing and gunnery range detachment from the Army's Fourth Air Force. As a part of the celebration, the base commander put on an aerial demonstration with his BT-14, the only plane at the new airfield at the time (the detachment had arrived in Tonopah only three days earlier). The range site southeast of town later became Sandia's Tonopah Test Range.

TTR: Salton Sea Successor

should be. And it came with a colorful history (see "The Ups & Downs of Tonopah Town").

TTR was carved out of the Air Force's Nellis Bombing and Gunnery Range. Its 525-square-mile area made it some seven times larger than the Salton Sea Range. The impact area was a long, level valley, bordered by the Cactus Range on the west and the Kawich Range on the east and "dotted with the remains of former lake beds," notes early Sandia historian Ted Alexander.

The most northerly of the dry lake beds, Pork Lake, was selected as the main impact point. (Pork Lake is 41 miles from the town of Tonopah by highway.)

In the early days, the drop target was defined by spraying a 300-ft.-diameter ring of road oil on the lake bed. (It's now a 750-ft.-diameter concrete pad that's one foot thick, with a black-and-white bull's-eye in the center.)

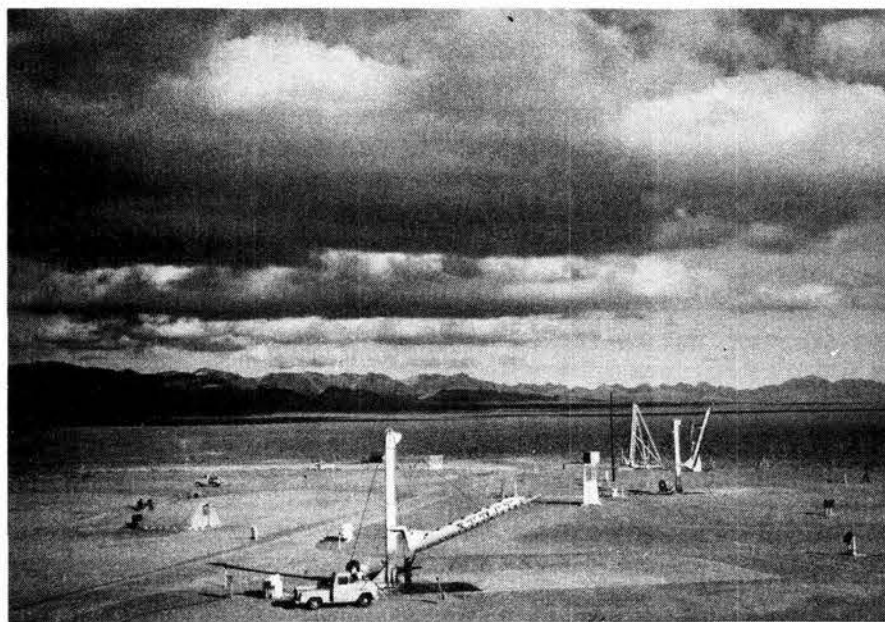
The first test at TTR was a drop test of a Mk 5 reentry vehicle during the day on Feb. 4, 1957; that night a Mk 15 weapon shape was dropped. The Sandia crews that gathered data from these and later drops were brought in one week each month from Salton Sea until 1960, when Salton Sea was closed. During that time, the only full-time Sandians at TTR were Harley Moody (ret. in '74), Pete Chevalier (ret. in '68), Al Gruer (ret. in '71, deceased), and Lloyd Young (7173). All four lived in the town of Tonopah and served as caretakers at the range each workday.

After 1960, the transplanted Salton Sea staff, plus others, also moved into town. That arrangement continued until 1969, when many Sandia families were relocated to Las Vegas.

Since then, almost all Sandians at TTR live in or near Vegas and commute to work at "Tonopatch" via airplane — an F-27 until 1979, a DC-9 since then. Fifteen Sandians have logged more than a million miles on these commuter flights. ●BH



TTR IS DOTTED with abandoned cabins once occupied by ranchers or miners. Dry climate preserves wooden structures amazingly well. This one at Sulphide Wells probably belonged to a miner; note the winch and the one-cylinder engine.



LOOKS AS IF he's lighting the fuse on the rocket in this launcher at TTR. Not so. It may have been 25 or more years ago, but Tonopah did not earn its enviable safety record by taking chances.



WILD HORSES have roamed the Test Range since its earliest days. Today they're something of a bother — though the horse here probably believes it's TTR's drop tests that do the bothering.

Through Two Looking Glasses



Tim George (6313) was an impressionable 11 years old and Jim Yoder (2825) was an attentive teenager when they came to visit Sandia on Family Day '59.

"That close-up view formed my image of Sandia," Tim says. In any event, it clicked in with a number of

things his dad Ronald had told him about his own work (in plant maintenance) here at the Labs.

Tim remembers in some detail a packing demonstration at the parachute lab. "The technicians were using big mallets to beat in the chutes," he recalls. "But what excited me the most was the big machine shop in Building 840," he says. "It was the size of the whole shop — and the equipment — that impressed me."

The effects of the visit didn't wear off. "Seeing Sandia made me inquisitive," he says. "I became interested in science and later took part in science fairs in junior high."

Twelve years later, Tim entered Sandia's apprenticeship program — five years long, just as it is today — in plant maintenance. Then he had a stint at the power tower.

Today he's doing field work on the Nevada Nuclear Waste Storage Investigation project: computing the water-travel times through volcanic tuff at Yucca Mountain.

He's planning to bring his own children, two sons age 9 and 12 and a daughter of 5, to Family Day '86 in October. "In the meantime, they all want to participate in the Family Day art contest," he says.

Sizing Up Sandia's Computers

Jim Yoder's dad Robert had also worked at Sandia for many years (in fact he retired only two years ago as the department manager in Finance). Yet it took Family Day "to help establish the course of my career," says Jim.

What he remembers best from that day is the IBM 704; he knew enough about computers to understand the demonstration. "I also remember how large things seemed," he recalls. "Some areas seem primitive in retrospect. Building 880, for example, was several acres of nothing but desks and partitions."

Jim joined Sandia as a staff assistant — today's equivalent of a tech aide — on the last working day



THOSE WONDERFUL TURNING MACHINES are what got Tim George (6313) interested in Sandia 27 years ago. Today his work is more earthy: It's on the geotechnical end of energy projects at the Labs.

of 1966. By then the 704 was obsolete and gone. In its place came the CDC 6600, which is still around today.

Now Jim is basically in the same organization that he joined 20 years ago. But now he is a supervisor — of a division that is designing the Nuclear Weapons Complex test data system, work that involves many computers, networks, mathematical analyses, and artificial intelligence systems.

"One of the things I really look forward to at Sandia is Family Day," he says. "It's a chance to attend an event that brought me here in the first place." The visit will be the second one for his 13-year-old son.

The third generation of Georges and Yoders may well be on their way to being hooked by the T-bird.

Welcome

Albuquerque

Carol Spector (133)

California

Ming Lut So (2311)

Colorado

Michael Olbin (3316)

Kansas

Dale Dubbert (2345)

Electronic Isolation



Computers are great for relaying information, but they're not much on conversation. Researchers at the Organizational Behavior Institute reported recently that new work styles, by which workers transfer information via computers rather than in person, threaten to reduce productivity with too much isolation. The most drastic changes in work style are occurring among white collar workers.

Studies showed that people work more effectively when they can interact with others in the course of their duties. Productivity increases when workers feel they are a part of a team.

The Institute suggests three simple methods of maintaining clerical and professional morale: (1) Allow each person at least one other person within viewing range; (2) Update workers on colleagues' achievements with newsletters and interactive meetings; and (3) Plan the same number of social events as took place before re-organization.

Journal of American Insurance

Real Men Don't Use Keyboards



"If this much-ballyhooed machine is really going to be the technological centerpiece of our future, why haven't more high-level managers signed on? The answer usually given is technophobia — fear of new technology, specifically computer technology — in one of its many pernicious forms. At the lighter end of the spectrum are supposed executive concerns that might be lumped together under the rubric, 'They laughed when I sat down at the keyboard.' Your average manager, the theory goes, is desperately afraid of typing. If he's a male of executive vintage, this is because he never learned to touch-type, the poor ninny. Another school of thought maintains that the executive's real fear is being *seen* typing. People are going to spy him or her sitting there in the corner office, seated behind a huge desk, wearing a \$500 suit, pecking away at seven words per minute, and they're going to think, 'It's a — gasp — secretary in there.' Instant crippling loss of status."

Walter Kiechel III in *Fortune*



APS SUPERINTENDENT Lillian Barna visited Sandia recently to learn of ways in which the schools and the Labs could work together. One of those ways is to get students and teachers involved with such areas of Sandia expertise as computer-aided design. Here, Don Hicks, a drafting teacher at Highland HS who spent his summer in Design Definition Department 2850 as part of the STEP (Summer Teacher Enrichment Program), shows Lillian a CAD system.



NO ORDINARY BALL GAME: Since her birth seven years ago, Diana has had trouble with coordinated movements, but her physical therapist at the Rehabilitation Center Inc. is helping to build up her repertoire. The little girl needs a lot of work on spatial concepts; the oversize beach ball makes it all a lot of fun.



AMANDA HAS A CHANCE at the Rehabilitation Center Inc., where a physical therapist helps the 4-year-old cerebral palsy victim swim to improve her muscle tone. Amanda is blind, nonverbal, and incontinent — and may have no hearing. The expectation is that her life span will be a normal 60-70 years.

e**c****p**

the need continues

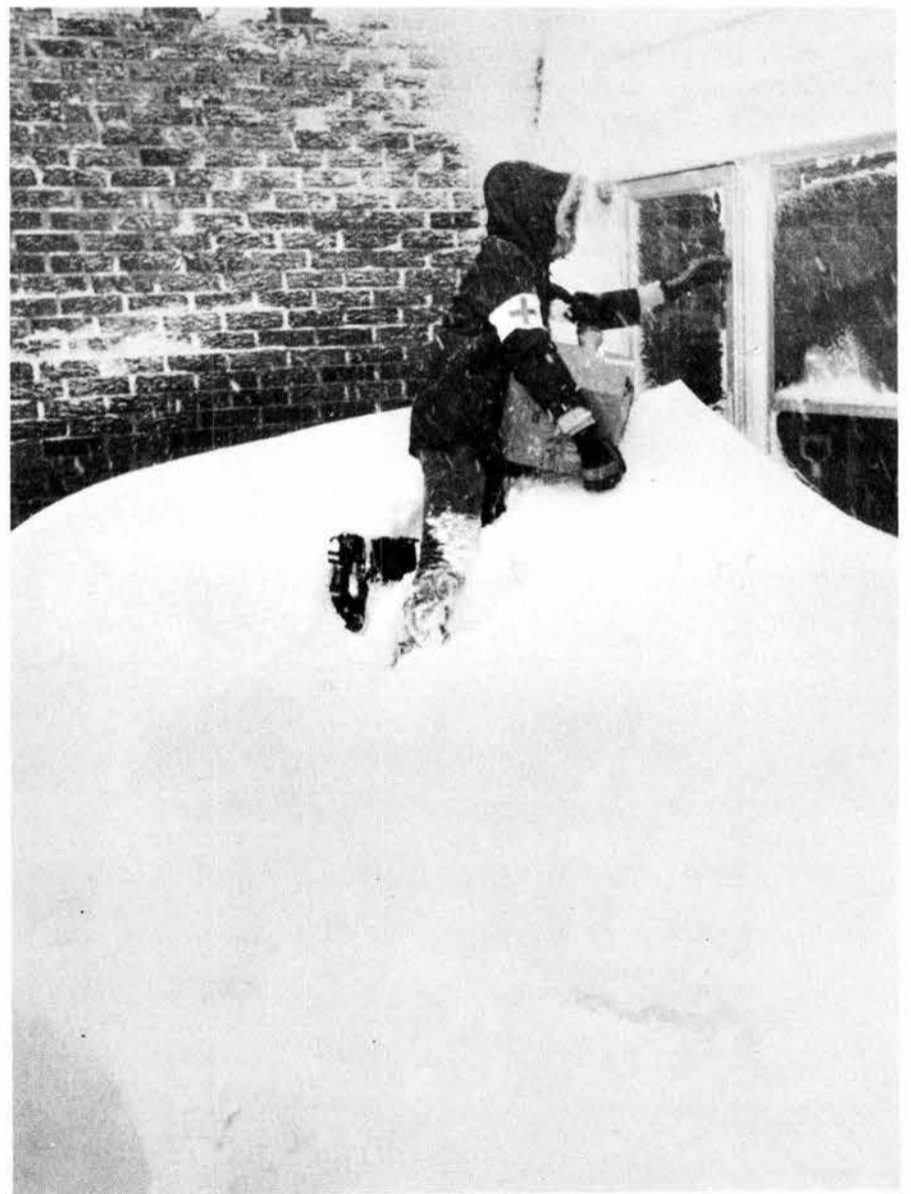
**Give your Fair Share
to United Way
October 6-10**



GETTING KIDS OFF THE STREETS isn't easy, but the Heights' Boys Club (near Comanche and San Mateo) draws them in with four tempting rooms full of games, including foosball, pool, basketball, dominoes, puzzles, and cards. Both girls and boys of all ages can come in and play; they have to put back the equipment after the game is over.



GOSPEL SINGER Rose Saracen (left) and pianist Bobbie Coulson, a volunteer at Share Your Care, are in tune at the adult day care center in the NE Heights. The United Way agency is celebrating its tenth anniversary of service to the frail elderly and to moderately handicapped adults.



FOOD PACKAGE IN HAND, an American Red Cross volunteer makes a delivery to a snowbound senior citizen after a blizzard in the Duke City. In any disaster, including too much precipitation of any sort, the mid-Rio Grande chapter of the United Way agency makes available a wide range of services. Health services include CPR training and blood pressure testing.

G. H. Q.
AMERICAN EXPEDITIONARY FORCES,

GENERAL ORDERS (No. 38-A.) FRANCE, February 28, 1919.

MY FELLOW SOLDIERS:

Now that your service with the American Expeditionary Forces is about to terminate, I can not let you go without a personal word. At the call to arms, the patriotic young manhood of America eagerly responded and became the formidable army whose decisive victories testify to its efficiency and its valor. With the support of the nation firmly united to defend the cause of liberty, our army has executed the will of the people with resolute purpose. Our democracy has been tested, and the forces of autoeracy have been defeated. To the glory of the citizen-soldier, our troops have faithfully fulfilled their trust, and in a succession of brilliant offensives have overcome the menace to our civilization.

As an individual, your part in the world war has been an important one in the sum total of our achievements. Whether keeping lonely vigil in the trenches, or gallantly storming the enemy's stronghold; whether enduring monotonous drudgery at the rear, or sustaining the fighting line at the front, each has bravely and efficiently played his part. By willing sacrifice of personal rights; by cheerful endurance of hardship and privation; by vigor, strength and indomitable will, made effective by thorough organization and cordial co-operation, you inspired the war-worn Allies with new life and turned the tide of threatened defeat into overwhelming victory.

With a consecrated devotion to duty and a will to conquer, you have loyally served your country. By your exemplary conduct a standard has been established and maintained never before attained by any army. With mind and body as clean and strong as the decisive blows you delivered against the foe, you are soon to return to the pursuits of peace. In leaving the scenes of your victories, may I ask that you carry home your high ideals and continue to live as you have served—an honor to the principles for which you have fought and to the fallen comrades you leave behind.

It is with pride in our success that I extend to you my sincere thanks for your splendid service to the army and to the nation.

Faithfully,



Commander in Chief.

OFFICIAL:
ROBERT C. DAVIS,
Adjutant General.

Copy furnished to *Mr. Clyde H. Ross*
500 4th St. S.W.
Albuquerque, N.M.
Commanding.

THIS LETTER from Gen. John "Black Jack" Pershing was received by Clyde Ross on his discharge from the Army. They don't write like that anymore.



This is my father, Clyde Ross, just before he shipped out to France in 1916 or 1917. He was a motorcyclist who ran messages for the Rainbow Division 300C, a division infamous for the high number of men killed in action. He was on the receiving end of the last major German offensive near the end of the war and was wounded in action. He died in 1984.

Steve Ross (1200)

Fun & Games

Golf — KAFB is the host for the Fourth Annual Hispanic Scholarship Golf Tournament next Monday at Tijeras Arroyo Golf Course. Each year the tournament kicks off KAFB's Hispanic Heritage Week activities. Tournament proceeds go to the scholarship fund of a Hispanic organization. This year's recipient is IMAGE de Albuquerque. Tournament fees are \$25. Entry forms are available at the LAB NEWS office in Bldg. 814. Deadline for entering is today. Call Eddie Melendez on 4-7826 for more information.

More Golf — The results of the Sandia Golf Association (SGA) Mountain Classic in Los Alamos on Aug. 22 are in. First place winners in the First Flight were Phil Federico (314) and Gerald Wilson (1651); their net best ball score was 62. Jose Gonzales (7482) and Mabe Foster (2631) were second with a net score of 63. In the Second Flight, Frank Arellano (6422) and Ken Ronquillo (1632) were first with a net of 63. Bill Curtis (2157) and Dan Buller (1111) were second with a net score of 65.

Softball — The Manzano and Airguard ball fields are the sites for the Lab vs. Lab Softball Tournament scheduled for Sept. 13-14. Competing in the round-robin tournament will be 6 men's and 4 women's teams from Sandia and Los Alamos. Play starts at 8 a.m. both mornings.

Tennis — The Sandia Tennis Association (STA) would like to thank those who participated in the Labor Day Weekend tournament at the Coronado Club. Fine weather, good friends, intense tennis action, and a little beer were welcome companions. The results of the tournament are as follows: Gene Smit (3463) defeated Ken Hanks (7866) in the Men's A finals. David Sealey (2631) defeated John Stichman (2335) in the Men's B finals. Charlene Schaldach (2627) defeated Shannon Longmire in the Women's finals. Lou Kuratko and Gene Smit defeated Ken Hanks and Mark Tucker (7544) in Men's Doubles. Terry Martinez (1260) and Charlene Schaldach defeated Sara Cericola and Kathy Schirber in the Women's Doubles finals, and in Mixed Doubles Mark Tucker and Staci Schmidt defeated Joe Ruggles (7865) and Charlene Schaldach. With action like this, who needs the U.S. Open?

Feedback

Q. Last January 1, KAFB began requiring Sandia employees to pay a fee to use the gymnasium and other base facilities to help defray maintenance costs. It is my understanding that Sandia Labs also contributes annually to the maintenance of these facilities for the benefit of its employees.

Previously, Sandians, along with DOE employees, enjoyed the free use of these facilities. Under the present arrangement, DOE employees will continue to enjoy free use.

Why is it that only Sandians must now pay a use fee for a facility such as the gym, which was originally built with AEC funds for the benefit of all Sandia Base personnel (including the military, Sandians, and AEC employees)? It seems to me that this is discrimination against Sandians, and the money Sandia presently contributes to these base facilities should be invested in a fund to be used for eventually building our own gym.

A. It is true that the AEC helped fund the base gymnasium many years ago. In addition, Sandia does reimburse the Air Force for custodial services, based on the use of the facilities by Sandia's guards.

The decision to charge Sandians for using facilities provided by the Base's Morale, Welfare, and Recreation Division was to provide a consistent policy for contractor employees. DoD contractor employ-

ees have had to pay a fee since 1983. Sandia and other DOE contractor employees must also pay this fee.

DOE employees were extended the same privileges as DoD civil service employees and, therefore, are excluded from the fee requirement.

P. M. Stanford - 100

Q. It disturbs me that Sandia refuses to renew ID cards when an employee's appearance has changed markedly. Yet, Security requires the badge picture to be up-to-date. Some of us use our ID cards frequently while traveling and would like an up-to-date picture, especially for visits to security installations. (Try getting into a lonely Air Force installation at 2 a.m. with a picture that doesn't look like you.) If my old badge picture wasn't good enough for Sandia Security, why is the same picture on my ID card good enough for everyone else's security? Isn't there some way I could get a new card, with high management approval, if necessary?

A. Your complaint is valid, and we have now changed the procedure to accommodate your request. When there is an appearance change that necessitates a new badge, we will also provide a new ID if the employee requests it.

J. D. Martin - 3400

Q. A few months ago, a new waxing compound was introduced in Bldg. 860. It is gorgeous to look at, but is so slippery that I have taken a couple of real spills. So far, the only injuries have been minor — just bruises — but this is getting rather old. Most of the men do not seem to be as affected as I am for some reason, perhaps because of the more uniform distribution of the load on men's shoe soles. In my case, it doesn't seem to matter which shoes I have on.

Is there anything that can be used in place of this that isn't so slick?

A. Recently we purchased high-speed buffing machines (burnishers), which are more efficient than the old machines because substantially more floor space can be buffed per time unit. These machines shine the floors with a lustrous wet-look appearance. We did not, however, change the floor wax applied to tile floors. This is a non-slip wax that we have used for several years with good results. While the tile floors now appear more lustrous, they still have the same non-slip quality as before.

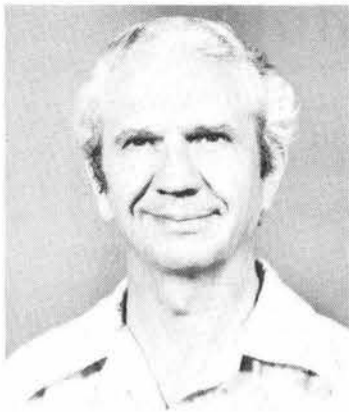
As a result of your Feedback, a Safety Engineer used a slip meter to test the tile in Bldg. 860 as well as in other buildings, including an area that had just been buffed. All readings were in the safe zone.

J. D. Martin - 3400

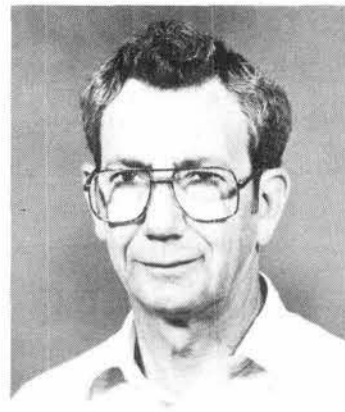
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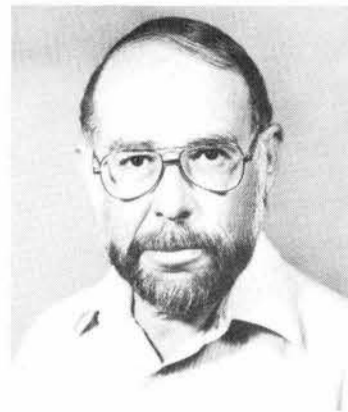
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Carl Bailey (2644) 25



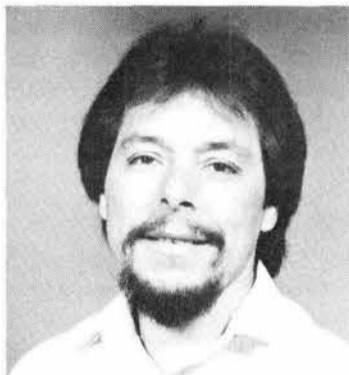
Larry Dyer (7524) 30



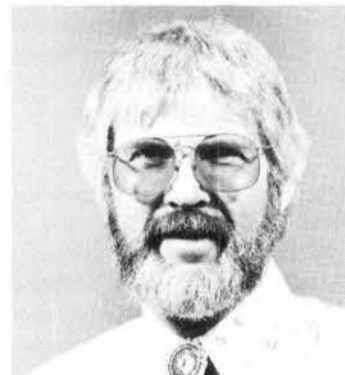
John Garcia (7481) 30



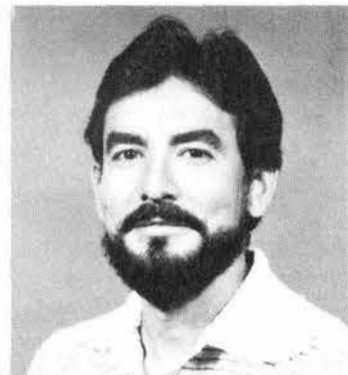
Ed Schreiner (7484) 30



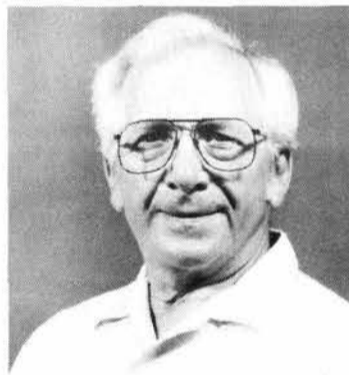
John Griego (5313) 10



Michael Sharp (5164) 10



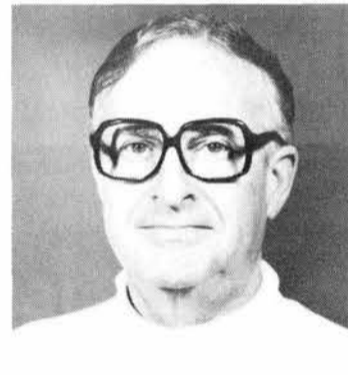
Margarito Crespín (7474) 15



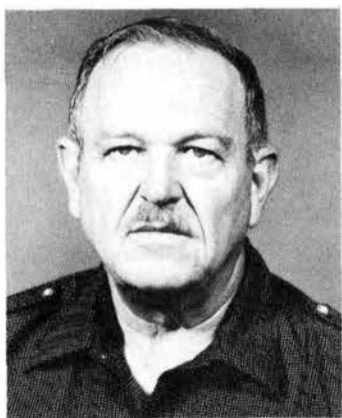
Joe Dalporto (7475) 25



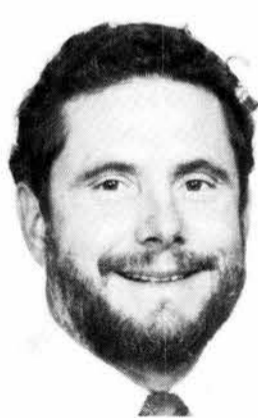
Ray Krieg (1521) 25



Don Sharp (1831) 15



Larry Harrah (310) 20



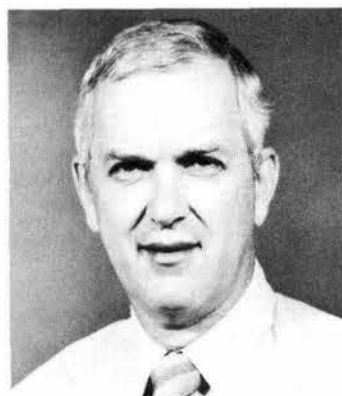
Paul Brewer (8260) 20



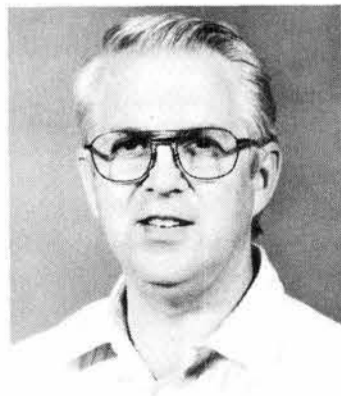
Al Reichmuth (8445) 20



Ralph Dalby (7474) 30



Robert Martin (5111) 25



Ken Nowotny (2645) 25



Charley Vittitoe (2322) 20

Coronado Club Activities

Ski Fair Features Schussboomer Specials

IT WON'T SNOW for a while (we hope), but the Coronado Ski Club's annual Ski Fair next Tuesday (Sept. 16) gives skiers a sneak preview of the latest equipment and attire for the slopes. It happens from 5-7 p.m. at the C-Club patio. After checking out the various equipment displays and exhibits, you can get the low-down on ski trips planned for the coming season — even sign up for 'em if you want to. Everybody's welcome at the fair, but only Club members are eligible to win the terrific door prizes furnished by area ski resort owners. The Ski Club does things right, so there's entertainment planned too, along with a cash bar and free munchies.

FALL'S IN THE AIR and that means Monday night football, right? You can watch it on the big screen at the C-Club lounge every Monday night starting next week. If you're not into football, we're told you can show off your skill at English mark darts (whatever *they* are) and other fun and games from 4:30 p.m.-closing. Looks like the best party in town, so see you on Monday nights in the lounge.

DON LESMAN and his crew provide an evening of big band sounds next Friday night, Sept. 19, from 8-midnight. Escape from hard rock — no high-decibel level here — and dance your troubles away to the strains of the golden oldies. Featured on the two-for-one dinner special menu are prime rib and fried scallops. It's the best deal in town — your choice of two dinners for a paltry \$14.95. And remember, Chef Henry comes up with different two-for-one alternatives every week; when you call for reservations (265-6791), ask what else is on the menu.

A GOOD DEAL — and a good time — is what you can expect if you join those tricky T-Bird card players in their fun and games. The group gets together next time in the ballroom on Monday, Sept. 22, starting at 10:30 a.m. You're invited to shuffle on out to see some of the fastest card-slinging in the West!

SPEAKING OF SHUFFLE, the sagebrush shuffle music of those well-known Isleta Poor Boys will fill the ballroom two weeks from tonight (Sept. 26) from 8-12. Filet mignon and poached halibut are the advertised specials on the two-for-one dinner menu before the dancing starts. Be sure to let the Club office know you plan to be there, so those super-efficient folks can figure how much cattle rustling and fish poaching they need to do ahead of time.

THOSE THUNDERBIRDS are gonna get organized, or so they tell us. The T-Bird annual meeting is set for Monday, Sept. 22, at 2 p.m. (C-Club). Come on out to elect officers and to talk about activities for the coming year; it's a good chance to let your feelings be known. The proposed slate of officers: Bob Butler, president; Charlie Kaspar, v.p.; Rita Fjelseth, secretary; Jim Caller, treasurer; Charlie Clendennin and Pat Liguori, executive committee. Nominations from the floor are welcome too.

THE ARTIST SERIES, received with much enthusiasm in the past, gets back in the swing (literally) on Sunday night, Sept. 28. A special buffet from 5-7 p.m. features baron of beef, chicken divan, baked potatoes, vegetable, full salad bar, and assorted desserts for a low, low \$5.95. Afterward, the Talisman group provides some *very* smooth jazz — contemporary and classical, including some Duke Ellington favorites — from 7-9. Mark your calendar right now. Better yet, call in your reservation; otherwise, you might miss out on some fine dining and unique entertainment.



JOE (THE BARTENDER) GRIEGO has been keeping C-Club lounge customers happy for 20 years as of this month — the all-time Club employment longevity record. He invites everyone to stop in and help him celebrate!

LONESOME TRAVELER? Not if you're on C-Club trips, that's for sure! The super-imaginative travel committee has put together a bunch of get-away-from-it-all sojourns that make the most experienced wanderers wistful:

Your Lucky Day — This is it because you have one last chance to get in on the trip to Laughlin/Lake Havasu, set for Oct. 13-16. Rush on over — pronto — to the Club to sign up. Stay at the posh Edgewater Casino/Hotel in that wild and wooly gaming town of Laughlin; take a day trip to LH City, where you'll see London Bridge — smack dab in the middle of the Arizona desert. For \$150 you get RT motorcoach fare, three nights in Laughlin, a free breakfast or lunch buffet, and refreshments along the way.

Golden Opportunity — Head for southern Colorado and northern New Mexico when those aspens are at their peak of autumn color, Sept. 27-30. Serious photographers should not miss this chance to snap lots of extraordinary pictures. For a miniscule \$145/person, you get charter bus fare; two nights' lodging in Telluride, one of the best-preserved old mining towns around; a night in Pagosa Springs; meals, including several continental breakfasts and lunch on the bus your first day out; dinner at Rancho de Chimayo on the way back to Albq.; refreshments on the bus; and taxes and tips. Of course, the wonderful scenery along the way is thrown in for good measure.

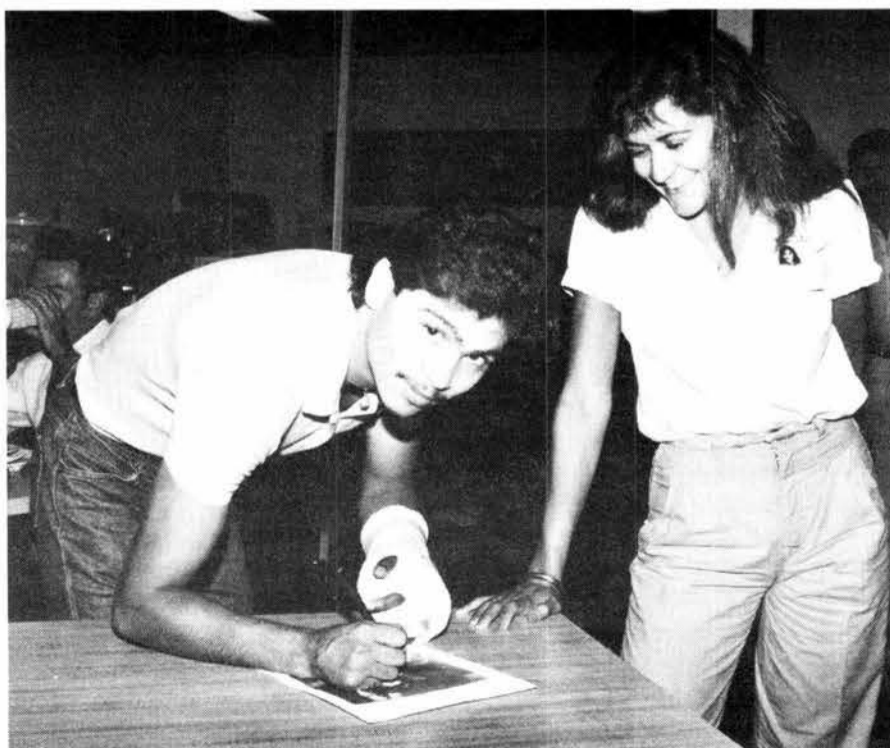
Carnival in Rio — And a whole lot more are yours when you sign up to head for South America from Feb. 27-March 12. It's not too early to think about 1987, and what a way to go! Besides Rio, you'll visit other exotic cities in three countries — Brazil, Argentina, and Peru — and take an all-day trip to the lost city of Machu Picchu to explore ancient ruins. The tab of \$2200/person includes round-trip air fare, 12 nights' lodging, three dinner shows, daily continental breakfasts, baggage handling and transfers, and five city tours (Rio de Janeiro, Buenos Aires,

Sao Paulo, Cuzco, Lima).

White Sandy Beaches — Relax and unwind during a resort vacation at the fabulous Club Cozumel Caribe located (where else?) on the island of Cozumel off Mexico's Yucatan coast. Spend a week (Nov. 11-18) savoring those blue Caribbean waters at a place where everything — and we mean *everything* — is included: all meals; unlimited beer, wine, and cocktails; all room, food, and bar taxes; all sorts of entertainment, such as beach parties, fiestas, box-office hit movies; use of all CCC facilities (tennis, volleyball, shuffleboard); and unlimited water sports. The trip price of \$745/person covers RT air fare, seven nights' lodging, moonlit cruises, and all of the above.

Canyon Color — The C-Club trip to Canyon de Chelly is probably *the* weekend bargain of the year. The bus is full for the Oct. 25-26 jaunt, but travel honcho Marv Plugge tells us that unprecedented demand prompts organization of a second trip on Oct. 26-27. The low tab of \$98/person buys you charter bus fare, a night at the Thunderbird Lodge, jeep tour of both canyons, continental breakfast the first day and a picnic lunch at Wheatfields Lake, and a stop at the historic Hubbel Trading Post.

Winter in Sunny Calif. — Start the new year right by treating the whole family to a trip to southern California from Dec. 29-Jan. 2. This one includes an all-day visit to Disneyland, an ocean cruise to Catalina Island, a tour of Universal Studios, reserved seats for the Tournament of Roses parade (much better than watching it on the tube!), and a full day of sightseeing — including a stop at the *Queen Mary* — topped off by dinner at Castagnola's Lobster House at Marina del Rey. The cost of \$398/person (dbl.) gets you all of the above, plus round-trip air fare to LA and four nights' lodging at the new Desert Inn Hotel, located right across the street from Disneyland. Optional at extra cost: the gala New Year's Eve party at Disneyland.



HIS ARM'S IN A SLING, but it isn't because of all the autographs he had to sign at the Sandia cafeteria last month. (That's Juliana Garcia, 7250, waiting for his Juan Hancock.) Boxer Paul Gonzales was in town to kick off United Way's annual campaign and visited Sandia — lunch lines were up by 30 percent that day — to encourage employees to support ECP in the fall. If you would like to see a videotape of Paul's rise from gang member to Olympic Gold Medalist, call Karen Shane (3163) at 4-3268.